FILE

E P A PROJECT

ECOLOGY AND ENVIRONMENT, INC.

MEMORANDUM: REGION VII

TO: Bill Keffer, SVAN/EP &R
Michael Sanderson, ENFC/CMPL

THRU: Jim Buchanan

FROM: John Zirschky

DATE: February 20, 1981

SUBJECT: Collis Corporation, Clinton, Iowa; TDD#F-7-8010-4A

On November 13, 1980, Ken Snell and myself conducted an inspection of Collis Corporation in Clinton, Iowa. The purpose of this inspection was to determine if Collis' waste management practices were adequate for the protection of public health and environment. Reports of cyanide gas poisoning resulting from the decomposition of electroplating sludge at Collis were forwarded to EPA from IDEQ in September of 1980. A detailed inspection report which described this incident and other past problems at Collis was prepared on November 19, 1980, and should be referenced for further information.

Sludge and effluent samples were collected from the wastewater treatment system during this inspection. Sample number AN21C2 was collected from the sludge hopper where the most recently generated sludge was stored. Sample number AN21C3 was collected from one of the pits used for sludge disposal. Collis was in the process of cleaning out these sludge pits during our inspection. The effluent sample, AN21C4, was collected from a pipe identified by Collis officials as their effluent sampling point. The analytical results from these samples have recently been completed and are summarized in Table 1.

As can be seen from Table 1, the sludge samples contain chrome, cyanide, and zinc in relatively high concentraions. Other metals such as copper, barium, nickel, iron, and mercury were also found in the sludge. This sludge is classified as hazardous under RCRA as a waste water treatment sludge from electroplating operations (F006) and can be considered both reactive and toxic. The effluent from the wastewater treatment system also contained chrome, cyanide, and zinc in relatively high concentrations, although only the total chrome and zinc levels exceeded the Iowa discharge levels for the facility. The pH of the discharge, 10.5, was also high. Optimum removal of chromium and zinc occurs at about a pH of 9. The pH of the effluent was not determined in the field, but instead was determined at the EPA Region VII lab. Collis officials may therefore state that since the pH was not determined in the field, the pH data is not valid or is questionable. The zinc and chromium data, however, should not be questionable.

TABLE 1. SUMMARY OF DATA FROM COLLIS CORPORATION, CLINTON, IOWA.

SAMPLE LOCATION SAMPLE TYPE SAMPLE NUMBER UNITS	SLUDGE HOPPER SLUDGE AN21C2 mg/kg	SLUDGE PIT SLUDGE AN21C3 mg/kg	EFFLUENT SAMPLE PT. WASTEWATER EFFLUENT AN21C4 ug/l*	IOWA DISCHARGE LEVELS ug/kg*
Hex. Chrome	<1.0	<1.0	<50	50
Total Cyanide	2800	3400	302	
pH, std units	-	-	10.1	6-9
Silver	<1.0	<1.0	< 5	
Aluminum	304	676	88	
Arsenic	< 50	<50	<50	
Barium	17.8	23.1	6	
Beryllium	<1.0	< 1.0	<2.0	
Cadmium	<1.0	<1.0	<2.0	
Tot. Chromium	32,200	26,200	1030	380
Copper	35.3	59.4	5	
Iron	7320	8390	573	
Manganese	69.3	53.0	3	
Nickel	110	231	45	
Lead	< 5.0	<5.0	< 50	
Antimony	<1.0	<1.0	< 50	
Selenium	< 50	< 50	<50	
Zinc	60,100	36,000	1,510	750
Calcium	63,200	96,200	50 mg/l	
Magnesium	6,110	6820	3 mg/l	
Sodium	1390	6110	673 mg/l	
Mercury	0.02	0.01	< 0.2	

*except as noted

As mentioned in the November 19, 1980, inspection report, subsurface migration of oil from another disposal area was observed in this inspection. Migration of leachate from the sludge pits, therefore, seems highly likely. The effect that such leachate might have on an adjacent drainage ditch is unknown. On November 12, 1980, IDEQ inspected Collis and found them discharging sludge and supernatent from these pits into this adjacent drainage ditch. Such direct discharges of waste into the drainage ditch make it difficult to determine what effec t subsurface leachate may have. Previous inspections by both IDEQ and EPA have noted the presence of sludge in this drainage ditch.

Once the pits were cleaned out, Collis planned to convert the pits to settling basins. Sodium hydroxide, instead of the lime being used at the time of the inspection, was to be used to raise the pH of the wastewater and force the chrome, zinc, and cyanide to precipitate. After the pH was raised, the wastewater would be diverted to the settling basins. After sedimentation had occurred, the effluent from the basins would be filtered and discharged to the drainage ditch.

Using sodium hydroxide instead of lime has the advantage that a smaller volume of sludge will be produced by Collis. A major disadvantage to this system is that the basins once used for sludge disposal will be used to contain primarily water. At the time of the inspection, Collis had no plans to line the bottom of these basins. The potential for migration of contaminated water through the bottom of these basins is significant. Once this system becomes operational, samples from the basins and from the drainage ditch upstream and downstream of Collis should be routinely collected to check for subsurface migration. Groundwater monitoring wells should also be considered for detecting such migration. If significant contamination is found, these basins should be lined with an impervious material.

These sample results in conjunction with the November 19, 1980 inspection report should be reviewed to determine if Collins has violated their discharge permit, and if their waste management practice violate any other applicable regulations. Additional sampling should also be performed at this site as outlined earlier.

John Zirschky John Zirschky

JZ:vj
Encl.